THIRD FIVE-YEAR REVIEW REPORT FOR THE REICH FARM SUPERFUND SITE OCEAN COUNTY, NJ

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

Approved by:

Walter E. Mugdan, Director
Emergency and Remedial Response Division

Sept. 30, 2013
Date

Table of Contents

Tables

Attachments

Executive Summary

This is the third five-year review for the Reich Farm Superfund Site (Site). The Site is located in Toms River, Ocean County, New Jersey. The Site Record of Decision (ROD) called for thermal desorption of contaminated soils and the extraction and treatment of contaminated groundwater. The soil treatment was completed in 1995; the extraction and treatment of the contaminated groundwater will continue until cleanup goals are met.

The results of this five-year review found that the remedy is operating in accordance with the ROD and subsequent Explanations of Significant Differences (ESDs). The immediate threats have been addressed, the remedy is protective and the groundwater cleanup goals are expected to be achieved through continued treatment of contaminated groundwater.

Five Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Reich Farm		
EPA ID: NJD980529713		
Region: 2	**State:** NJ	**City/County:** DOVER TOWNSHIP/OCEAN COUNTY

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): Jon Gorin
Author affiliation: US Environmental Protection Agency
Review period: 7/15/08 – 3/23/13
Date of site inspection: February 20, 2013
Type of review: Policy
Review number: 3
Triggering action date: 9/22/08
Due date *(five years after triggering action date)*: 9/22/13

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Click here to enter text.

Five-Year Review Summary Form (continued)

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): None	**Issue Category: Operations and Maintenance**			
	Issue: Toxicity value for SAN Trimer needs to be developed.			
	Recommendation: Develop site-specific cleanup levels for SAN Trimer in soil and groundwater.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	EPA	EPA	9/30/2018

Sitewide Protectiveness Statement	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Protective	*Addendum Due Date (if applicable):* *N/A*
Protectiveness Statement: The remedy at the Reich Farm Superfund Site is protective of human health and the environment.	

U.S. Environmental Protection Agency
Region 2
Emergency and Remedial Response Division
Third Five - Year Review
Reich Farm Superfund Site
Toms River, Ocean County, New Jersey

I. INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 2, conducted this five-year review of the Reich Farm Superfund Site (Site) pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended and 40 CFR 300.430(f)(4)(ii), in accordance with the Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P (June 2001) and the updated Five-Year Review Summary Form, OSWER 9200.2-105 (December 2011).

The purpose of a five-year review is to assure that implemented remedies protect public health and the environment and that they function as intended by the decision documents. This report will become part of the Site file.

This is the third five-year review for the Site. In accordance with Section 1.3.2 of the five-year review guidance, a policy five-year review is triggered by a site's construction completion. The trigger for the first five-year review is the date of the Preliminary Close-out Report, which was September 1998. The trigger of the third five-year review was the completion date of the second five-year review, which was September 2008.

II. SITE CHRONOLOGY

Table 1 summarizes the Site related events from discovery to the present.

III. Background

Physical Characteristics:
The Reich Farm property (Property), which comprises part of the overall Site, is located on Lakewood Road in the Pleasant Plains section of Toms River, New Jersey. The property encompasses three acres and is surrounded by commercial and residential areas.

The Kirkwood-Cohansey aquifer system underlies the Property. The upper portion of the system is generally referred to as the Cohansey aquifer, and is the principal source of drinking water for the area. The lower portion of the aquifer is known as the Kirkwood aquifer. The average depth to groundwater beneath the Property is approximately thirty feet. The direction of groundwater flow in this system is generally to the south-southwest; however, pumping at the United Water of

Toms River (UWTR) Parkway Well Field (Well Field), which is one mile south of the Property, has a strong influence on the local shallow groundwater flow.

Land Resource and Use:
Currently the Property is being used for commercial purposes, specifically to store construction material. The Property zoning, commercial/residential, is not expected to change over the next five years.

History of Contamination:
In December 1971, approximately 4,500 drums containing wastes and 450 empty drums from the Union Carbide Corporation (UCC) Bound Brook chemical manufacturing facility were discovered at the Property. In 1972 and 1974, UCC removed the drums and some contaminated soil from the Site.

In 1974, the Dover Township Health Department (now the Ocean County Health Department) issued a zoning ordinance restricting private well use around the Site due to groundwater contamination. Currently, all residences and businesses within the area affected by groundwater contamination associated with the Site are connected to the public water supply. The public water supply has continuously met federal and state safe drinking water standards.

Initial Response:
In September 1983, EPA included the Reich Farm Site on the National Priorities List of Superfund Sites. In 1986, EPA commenced a remedial investigation and feasibility study (RI/FS) at the Site pursuant to CERCLA. The purpose of an RI/FS is to identify the nature and extent of contamination and to develop cleanup alternatives.

The RI confirmed the presence of groundwater and soil contamination. Contaminants identified in the groundwater and soil included 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE) and tetrachloroethylene (PCE).

Following issuance of the September 1988 ROD, EPA entered into a judicial Consent Decree with UCC, the Site's potentially responsible party (PRP), for performance of a design and construction of the selected remedy.

In 1996, a statistically significant elevation in the rates of certain childhood cancers was found to exist in the Toms River area. In response to this finding, New Jersey's Department of Health and Senior Services (NJDHSS), in cooperation with the U.S. Agency for Toxic Substances and Disease Registry (ATSDR), undertook an analysis of various potential causes of the elevated cancer rates. During that effort, the presence of a group of unregulated, previously unknown semi-volatile contaminants (SVOCs) was noted in the Site's groundwater plume. These contaminants, which are Site related, were later identified and are now referred to collectively as the SAN Trimer.

Basis for Taking Action:
During the RI, a Public Health Evaluation (Evaluation) was performed to determine if there were unacceptable risks to human health due to either direct contact with Site soils, or consumption of Site-contaminated groundwater. The Evaluation found that while there was no direct contact risk from the soil, the soil did present a source of SVOC and volatile organic compounds (VOCs) contamination to the underlying groundwater. In addition, the Evaluation found that there was a potential increased risk to human health if the Site-contaminated groundwater were consumed.

No ecological assessment was performed for the Site. In the RI, it was stated that the Site did not appear to pose a significant risk to the local flora or fauna.

IV. REMEDIAL ACTIONS

Remedy Selection
The ROD for the Site was signed in September 1988. The ROD selected the following objectives for the remedy:

- removal of 1,1,1-TCA, TCE and PCE from groundwater until federal and state cleanup levels are attained;

- treatment of soils contaminated with total VOCs above one part per million (ppm) and total SVOCs above 10 ppm.

The Site's ROD describes the selected remedy for contaminated groundwater and soil at the Site. The remedy called for the following:

- additional groundwater and soil sampling to further delineate contamination related to the Site;

- excavation and treatment of contaminated soil by enhanced volatilization (thermal desorption) to remove VOCs and SVOCs; and

- installation and operation of a groundwater pumping, treatment and reinjection system to remove VOCs from groundwater at the Site.

Subsequent to the ROD and under EPA oversight, UCC conducted pre-design activities, which included additional soil and groundwater sampling to further delineate the extent of contamination. This work was performed from 1990-1992 and the results were summarized in a May 1992 Remedial Design Report.

Based on the sampling results, EPA concluded that: (1) groundwater contamination from the Site extended approximately one mile south to the Well Field; and (2) the volume of contaminated soils at the Site was approximately 15,000 cubic yards (which significantly exceeded the initial

estimated volume of 2,000 cubic yards).

The groundwater data collected and the modeling performed during the pre-design work increased EPA's understanding of the movement and configuration of the groundwater contaminant plume. Based on this information, EPA issued the 1995 ESD. The ESD called for the Well Field's existing treatment system (i.e., an air stripper) to be used as the Site's groundwater remedy.

In 1997, the SAN Trimer was found in the same two Well Field wells (Wells #26 and #28) impacted by the other Site contaminants. The existing air stripper treatment system did not effectively remove the SAN Trimer.

In 1998, a second ESD was issued calling for the installation of additional treatment, in the form of activated carbon units, at the Well Field. The additional treatment would remove the SAN Trimer to an interim cleanup level of less than the laboratory detection limit. The interim level will remain in place until toxicity studies provide enough information for the development of a risk based cleanup level for SAN Trimer.

In order to help determine the potential carcinogenicity of the SAN Trimer, a New Jersey congressman nominated the substance to be tested by the National Toxicology Program (NTP). The testing, a multi-year perinatal carcinogenicity study, was completed in 2010 and the final peer reviewed report was released by the NTP in 2012. The NTP concluded that the SAN Trimer did not cause cancer in male or female rats. Based on the study results, EPA is developing Site-specific soil and groundwater cleanup goals for the SAN Trimer.

Remedy Implementation
The remedy has been implemented by UCC pursuant to a judicial Consent Decree. By June 1998, the PRPs had:

- treated 15,000 cubic yards of contaminated soil using thermal desorption technologies,
- backfilled and restored the Reich Farm property,
- added activated carbon treatment to the air stripper treatment system at the Well Field (as per the 1998 ESD),
- diverted treated water to a re-charge area,
- installed an additional containment well (Well 26b) at the Well Field to further control the plume, and
- performed groundwater monitoring.

The soil remedy was completed in 1995 and documented in a 1995 Remedial Action Report. The groundwater remedy's construction was completed in 1998 and documented in a 1998 Remedial Action Report.

In May 1997, UCC added activated carbon treatment following the air stripper treatment system for groundwater at the Well Field. Effluent sampling has shown that activated carbon effectively treats the SAN Trimer to nondetectable levels at an analytical detection limit of below 150 parts per trillion.

As an added protective measure, NJDEP recommended that treated water from the recovery wells (Well Field wells #26, and #28) not be used as a public water supply unless needed to meet demand for potable water. However, those wells must continue to operate to ensure the protection of the Well Field's production wells (wells #22, #24, #29 and #44). In addition, the recovery wells must operate to facilitate the ultimate cleanup of the groundwater plume.

The treated water from the recovery wells is currently discharged to the ground surface on an area close to the intersection of Route 9 and the Garden State Parkway (discharge area). To date, inspection of the discharge area indicates that the treated water appears to be adequately recharging to the aquifer. The treated water may also be used as a source of potable water at the discretion of the NJDEP.

In 1998, low levels of SAN Trimer were detected in a previously uncontaminated Well Field well (Well #29). EPA concluded that this was caused by higher than normal pumping of that specific well. In response, EPA directed UCC to place a pumping control device on Well #29, and to install an additional containment/recovery well at the Well Field (Well #26b). UCC later installed pumping control devices on four other Well Field wells. The maximum pumping rates allowed at each well in the Well Field are strictly controlled and specified in a 1999 legal agreement between UCC and UWTR.

Due to the earlier presence of 1,1,1-TCA, groundwater samples have been periodically analyzed for 1,4-dioxane. In 1997 samples collected from wells #26 and #28 were analyzed for 1,4-dioxane, which wasn't detected. In 2003, samples from six monitoring wells as well as from wells #26, #26b and #28 were analyzed for 1,4-dioxane. The recovery wells had no detections; however two of the monitoring wells (CHMW-4 and MP13) had detections of less than 1.0 ppb and 3.0 ppb respectively. Those concentrations are less than the concentration associated with the acceptable risk level. In 2011 water from CHMW-4 was again analyzed for 1,4-dioxane, which was not found at a detection level of 0.21 ppb.

The data collected from the Well Field production wells indicate that the water from these wells meets federal and state Maximum Contaminant Levels (MCLs) for drinking water and contain no detectable levels of SAN Trimer; therefore, these wells continue to be used as public potable water supply. In addition, it appears the mandated pumping rates at the Well Field continue to prevent the production wells from drawing in any remaining contaminants from the Site.

Systems Operation/Operation and Maintenance (O&M)
The PRPs have instituted a comprehensive monitoring program for the groundwater at the Site. The PRPs collect and analyze samples of the treated water at the Well Field on a monthly basis, and water from respective monitoring wells on a bimonthly, quarterly, semiannual, annual and biannual basis. In addition, water level measurements are collected semiannually from twenty-eight monitoring wells. Table 2 provides a summary of the ongoing groundwater sampling program.

In a 2011 letter to EPA, the PRPs requested permission to remove the air stripper portion of the groundwater treatment train. The air stripper had been installed to remove the VOCs, but is ineffective in removing SAN Trimer. EPA approved this request based on the fact that the three recovery wells have been meeting applicable groundwater standards for over five years and the up-gradient monitoring wells are near or below groundwater standards for VOCs. In addition, the carbon filtration system will be effective in removing residual VOCs if concentrations were to potentially rebound in the future. EPA's approval was contingent on NJDEP concurrence, which was granted in 2013.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The second five-year review noted that the NTP was performing a toxicity study on the SAN Trimer and that the results would be available by the end of 2010. The NTP released their study results by January 2011. The results were subsequently peer reviewed and a final report was issued by NTP in July 2012. The study found that SAN Trimer did not cause cancer in male or female rats. The final NTP report can be found at http://ntp.niehs.nih.gov/ntp/htdocs/LT_rpts/TR573_508.pdf.

Based on the NTP report, EPA anticipates developing toxicity values that will be used to set site-specific soil and groundwater cleanup levels for SAN Trimer.

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components
This review has been performed by the EPA remedial project team for the Site, consisting of the remedial project manager (Jon Gorin), human health risk assessor (Marian Olsen), hydro-geologist (Robert M. Alvey) and community involvement coordinator (Natalie Loney).

Community Involvement
The EPA remedial project manager, risk assessor and community involvement coordinator attend frequent citizens meetings regarding concerns on the elevated rates of local childhood cancer and also meetings on the toxicity testing of the SAN Trimer. The citizen's meetings are held by the Citizens Action Committee on Childhood Cancer (CACCC). From 1997-2001, the meetings were held on a monthly basis. As of 2001, the meetings occur on a roughly semiannual to quarterly basis. Since 2004, EPA's Reich Farm remedial project team has attended the meetings when EPA's input on issues specific to the Reich Farm Site are requested by the CACCC.

EPA has established two information repositories for the Site. One repository is at the Ocean County Public Library, 101 Washington Street, Toms River, New Jersey 08753. The second one is at EPA Region 2 offices, 290 Broadway, New York, New York 10007-1866.

On March 17, 2013, a notice describing the five-year review process was published in a local newspaper. The notice indicated that, upon completion, the five-year review would be made available at the local information repository. The notice included the RPM's name, address and phone number. No phone calls or mail from the public were received.

Document Review
The documents, data and information reviewed in completing this five-year review include the ROD, ESDs, remedial action reports and annual maintenance, biennial classification CEA certification and annual groundwater monitoring reports.

Data Review
The PRPs collect and analyze samples from monitoring wells, Well Field wells and from treated groundwater (see Table 2). EPA periodically collects split samples from the PRPs to ensure analytical results are accurate. In addition, the PRPs compile data on pumping rates of the Well Field wells to ensure compliance with the 1999 agreement on pumping rates.

A comparison of the January 1999, December 2007, December 2010 and December 2012 groundwater data show a general continuing decrease in groundwater contamination for both SAN Trimer and the VOCs (See figures 2 – 5).

In 1999, seven of the 25 monitoring wells sampled showed VOC contamination greater than New Jersey Groundwater Quality Standards (NJGWQS) (Figure 2a). Of these seven wells, two were on the Reich Property, two were mid-gradient between the Reich Property and the Well Field recovery wells, and three (MW-Swain, CHMW-4 and MP-8) were relatively close to the recovery wells. The highest concentrations of TCE were in MW-Swain (26.0 parts per billion (ppb)) and CHMW-4 (22.0 ppb). In 1999, both those wells also had PCE concentrations greater than the NJGWQS level of 1 ppb.

The 2007 results (Figure 3a) showed VOC exceedances in three wells; MW-Swain for TCE (4.3 ppb) and PCE (1.4 ppb); CHMW-4 for TCE (1.4 ppb); and MP-2R for TCE at 1.7 ppb. At that time, none of the seven Reich Farm Property wells showed VOC concentrations above the applicable NJGWQS.

In the December 2010 annual sampling event, one of the Reich Farm Property wells (MW-14S) showed a detection of VOCs; specifically 1.7 ppb for PCE (Figure 4a). None of the other six Property wells showed measurable levels of VOCs. By December 2012 the concentration for PCE in MW-14S was below 1.0 ppb, but samples from wells (MP-1R and MP-2R) down-gradient of the Property began showing low level (<2.0 ppb) detections (Figure 5a). This seemed to indicate that a slug of volatiles was released at the Property, which decreased in concentrations

as it moved south towards the Well Field.

A general decreasing trend since the 1990s was also seen for SAN Trimer. In 1999 there were four monitoring wells (MP-1R, MP-8, MW-Swain and CHMW-4) with SAN Trimer greater than 1.0 ppb (there is no cleanup level for SAN Trimer) (Figure 2b). The greatest concentrations were 3.0 ppb at MP-1R and 3.0 ppb in MP-8. By 2007 (Figure 3b) there was one well (MP-2R) with a concentration of SAN Trimer greater than 1.0 ppb (1.1 ppb). Other wells with detectable concentrations of SAN Trimer in 2007 were 0.21 ppb in MP-1R, 0.20 ppb in CHMW-4 and 0.16 ppb in MW-Swain.

During the December 2010 annual sampling event, MW-14S showed a detection of SAN Trimer of 34.0 ppb (Figure 4b). This was the same Property well that showed a detection of VOCs in 2010. None of the other six Reich Farm Property wells showed measurable levels of SAN Trimer in 2010. By December 2012 the concentration for SAN Trimer in MW-14S was below detection limits, but samples from down-gradient well MP-2R began showing low level detections (Figure 5b). As with VOCs, these detections seem to indicate that a slug of SAN Trimer was detected at the Property in the vicinity of well MW-14S sometime in 2010.

Aside from the VOC and SAN Trimer "slug" in 2010, a review of the data shows a general decrease in groundwater concentrations of VOCs and SAN Trimer over the last five years. VOC concentrations are now either meeting or only slightly exceeding NJGQWS in the monitoring and recovery wells (see Figure 5a). Except for well MP-2R, SAN Trimer levels are below or approaching the limits of detection in all monitoring and recovery wells (see Figure 5b).

Site Inspection
The EPA RPM and hydro-geologist performed a Site inspection on February 20, 2013. The Property and the discharge area for the treated water were inspected. The treated water appears to be recharging into the ground as intended by the design. The Property is currently being used by a local commercial operation to store construction material.

Interviews
As part of this five-year review, several key people involved with the remedy have been contacted:

Robert Casselberry, Remediation Manager – UCC. During a February 27, 2013 telephone interview, Mr. Casselberry indicated that he felt the remedy is working adequately and the groundwater is getting close to meeting cleanup levels. Mr. Casselberry also felt that the groundwater monitoring program was adequate and protective.

Joseph Meyer, Superintendent of Operations - UWTR. Mr. Meyer indicated that the filtration systems generally function well, and any issues are resolved within 24 hours. Mr. Meyer also indicated that UWTR has lowered the frequency of carbon change-out since the previous five-year review. There have been no breakthroughs detected over the last five years.

IC Verification
NJDEP instituted a CEA to prevent installation of groundwater wells into areas of the Site related groundwater contamination. The CEA remains in place.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Yes, the remedy is functioning as intended by the ROD signed on September 30, 1988 and the ESDs issued in 1995 and 1998.

Analysis of data over the past five years indicates that before being discharged, the groundwater is treated to meet applicable groundwater standards and the SAN Trimer levels are below laboratory detection limits. Since 1999, the controls in place on the various production wells at the Well Field have effectively prevented the plume from impacting uncontaminated wells. Monitoring data collected over the last five years has shown a general decrease in the concentrations of groundwater contaminants, including TCE, SAN Trimer and PCE. Additionally, the soil treatment, which was initiated to protect the underlying groundwater, appears to have largely addressed the source area of groundwater contamination, meeting the goals of the ROD. A low concentration slug of SAN Trimer and VOCs was detected in a Property monitoring well in 2010. The VOC detection (1.7 ppb) was just above the required cleanup level (1.0 ppb). The SAN Trimer detection of 34.0 ppb also occurred in the same monitoring well. By 2012, the well had VOC detections below cleanup levels and SAN Trimer below detection limits.

The actions taken have reduced the amount of contamination in the environment (both soils and groundwater) and are functioning as intended to prevent direct exposure to Site contaminants.

Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy still valid?

There have been no changes in the physical conditions at the Site that would affect the protectiveness of the remedy. The land is zoned commercial/residential, and it is currently being used for commercial purposes. The assumptions in the human health risk assessment (HHRA) are consistent with the zoning and current use. There have been no changes in the applicable or relevant and appropriate requirements and no new standards affecting the protectiveness of the remedy.

Soil
The exposure assumptions that were used to estimate the potential cancer risks and noncancer hazards in the risk assessment supporting the ROD for human health are consistent with current exposure assumptions. In order to protect groundwater, the ROD selected cleanup levels of 1 ppm for all VOCs and 10 ppm for all SVOCs. Post-cleanup sampling showed that these standards were met. The previous five-year review evaluated post cleanup soil concentrations for

total VOCs and SVOCs and confirmed that no concentrations of the contaminants of concern (COC) remain in the soil above current soil cleanup criteria. For the most recent five-year review, the Site's risk assessor updated the earlier evaluations based on the current residential regional screening levels (RSLs) associated with specific risk levels and also NJDEP Soil Cleanup Criteria for either residential direct soil contact or impact to groundwater. This update confirmed that the remedial action objective for soil cleanup of the COCs has been met and remains protective.

Groundwater

For groundwater, the ROD established cleanup goals consistent with the state and federal MCLs in place at that time. A comparison of the 1988 MCLs to present MCLs and NJGWQS (for TCE, 1,1,1-TCA and PCE, the only COCs remaining at detectable levels in the groundwater) shows no changes in values (Table 3). So, while this remedial action objective (i.e., groundwater meeting 1988 MCL levels) has not yet been fully achieved for all COCs, the objective remains valid.

SAN Trimer – Soil and Groundwater

In 2004, EPA collected samples of the treated soils and analyzed them for SAN Trimer. The samples showed SAN Trimer to be present in the soil and, in one case, to be above the ROD cleanup level for total SVOCs. Also, in 2010 there was a detection of SAN Trimer of 34.0 ppb found in groundwater from a monitoring well on the Reich property. Subsequent sampling of that well showed no detectable levels of SAN Trimer.

The Reich Farm property is currently being used solely for commercial purposes, specifically to store construction material. This activity will not cause exposure to the areas of SAN Trimer detections, which are at depth. In addition, the existing CEA prevents the installation of drinking water wells in the area. The soil and groundwater pathways have been interrupted. Based on the evaluation of the potential human exposures at the Site, as well as fifteen years of groundwater data, the 2004 and 2010 data points do not call into question the protectiveness of this remedy.

At the time of the ROD, EPA had no information or knowledge of the SAN Trimer, an SVOC at the Site. In 2012, the NTP completed toxicity testing for the SAN Trimer, so EPA now has data on which to begin developing cleanup goals for soil and groundwater. EPA is in the process of determining those goals.

Until the SAN Trimer cleanup goals are developed, EPA will continue to use a groundwater cleanup level of "nondetect" for SAN Trimer at the current method detection level. Once a cleanup level is developed for soils, EPA will reevaluate the soil remedy to ensure that it is protective of the underlying groundwater as well as current and potential future land use.

Vapor Intrusion

Soil vapor intrusion was not evaluated by EPA for the 1988 ROD. For the second five-year review, EPA compared the maximum concentrations of VOCs from the most current available groundwater data to the values listed in the 2001 OSWER "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (Guidance)

(www.epa.gov/correctiveaction/eis/vapor.htm). The maximum contaminant concentrations were below the Guidance screening criteria for TCE, PCE and 1,1,1-TCA.

Further, EPA compared the Henry's Law Constant for the SAN Trimer to the screening criteria identified in the Guidance and found it to be below the screening value. This means that it is not volatile enough to pose a vapor intrusion risk to structures overlying the groundwater plume.

Based on these analyses and the decline of VOC concentrations in monitoring wells over the last five years, EPA concluded further investigation of potential soil vapor intrusion is not necessary.

Ecological Risk Assessment
An ecological risk assessment was never conducted. Currently, Site-related contamination occurs in groundwater and at depth in soil. The groundwater is not impacting any surface water bodies. There is no unacceptable risk to ecological receptors from this Site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. No new information has called into question the protectiveness of the remedy.

Technical Assessment Summary

- Contaminated Site soils have been remediated and the current Site use is appropriate.
- Exposure to Site contaminated groundwater has been interrupted. There are no private drinking water wells within the plume of contamination and a state restriction (a CEA) is in place to prevent installation of new wells. Public drinking water wells are regulated by NJDEP.
- Groundwater monitoring wells are functional and show a general measurable reduction in contaminant concentrations throughout the groundwater plume as well as an overall decrease in the size of the plume.
- Groundwater extraction and treatment is operating as intended by the Site's decision documents.
- The cleanup goals set in the 1988 ROD are consistent with current standards and risk levels.
- Soil and groundwater cleanup levels will be developed for SAN Trimer.

VIII. ISSUES

EPA will develop toxicity values to be used to set cleanup levels for SAN Trimer in soil and

groundwater.

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Develop site-specific risk-based cleanup levels for SAN Trimer in soil and groundwater.

X. PROTECTIVENESS STATEMENT

The remedy at the Reich Farm Superfund Site is protective of human health and the environment.

XI. NEXT FIVE-YEAR REVIEW

The next five year review for the Reich Site should be completed before April 2018, five years from the date of this report.

Table 1 - Chronology of Events

Event	Date
An Independent waste hauler deposited drums of semi-volatile and volatile organic chemicals on property owned by Samuel Reich.	1971
The wastes were found to be from Union Carbide Corporation (UCC) - UCC removed all visible drums and the top layers of soil.	1972
Well restriction area enacted and residents hooked into public water supply.	1974
EPA added Site to the National Priorities List (Superfund)	1983
The Remedial Investigation completed by EPA.	1986
EPA issues a Record of Decision (ROD) for the Site.	1988
United Water of Toms River (UWTR) detected contamination in two Parkway Well Field Wells and installed air stripper.	1988
Additional groundwater studies indicated that the contaminated groundwater being treated at the Parkway Well Field was from the Reich Farm Site.	1991-93
Contaminated soil is treated using on-site thermal desorption technology.	1994-95
An Explanation of Significant Differences (ESD) was issued which modified the ROD to include continued treatment by air stripping at Parkway Well Field, rather than construction of a separate system.	1995
A group of unregulated semi-volatile compounds were found in the contaminated Parkway Wells. The compounds were identified as Styrene Acrylonitrile (SAN) Trimer.	1997
A carbon treatment system was installed by UCC to further treat the contaminated water. The carbon system removes SAN Trimer to below detectable levels before water is discharged.	1997
EPA issued a second ESD authorizing use of carbon treatment on the contaminated wells.	1998
Preliminary Close-Out Report (PCOR) issued.	1998
The SAN Trimer Workgroup - consisting of members of the federal and state governments; industry and the community - is formed to oversee toxicity testing of SAN Trimer.	1999
EPA analyzed treated site soil for SAN Trimer. Low levels of SAN Trimer were detected.	2003
EPA completed first Five-Year Review which determined that the remedy was protective of public health and the environment.	2003

EPA collects and analyzes additional treated soil at depth on the Reich Farm property.	2005
EPA completes second Five-Year Review, which determined that the remedy was protective of public health and the environment.	2008
SAN Trimer toxicity study completed by National Toxicity Program (NTP)	2012
Operation, monitoring and Maintenance	Ongoing
EPA developing cleanup criteria for SAN Trimer based on the NTP study results.	Ongoing

Table 2 Groundwater Sampling for the Reich Farm Site

Frequency	Parameters	Type of sample/Wells	# of Samples
Monthly	VOC and SAN Trimer	Combined treated water from Parkway Well Field Wells 26, 26b, and 28. And sample from lead carbon unit (to determine when carbon in lead unit needs to be changed).	2
Alternate months	VOC and SAN Trimer	Samples from 3 key monitoring wells and one United Water production well (UWTR #44)	4
Quarterly	VOC and SAN Trimer	Parkway Wells 26, 26b and 28 (untreated, uncombined).	3
semi-annual	water level measurements	Data collected from 26 monitoring wells and two UWTR production wells: #20 (which is not part of the Parkway Well Field, and lies outside western edge of plume) and well #44. MP9 is no longer sample as it has been destroyed	28
semi-annual	VOC and SAN Trimer	Samples from 4 monitoring wells and one UWTR production wells (UWTR #20)	5
Annual	VOC and SAN Trimer	Samples collected from 12 monitoring wells.	12
Bi-Annual	VOC and SAN Trimer	Samples from an additional four monitoring wells	4
Every third year	Video inspection	Discharge flow under Garden State Parkway for submittal to NJ Highway Authority.	1

Table 3 Comparison of 1988 State and Federal MCLs to Current Values.

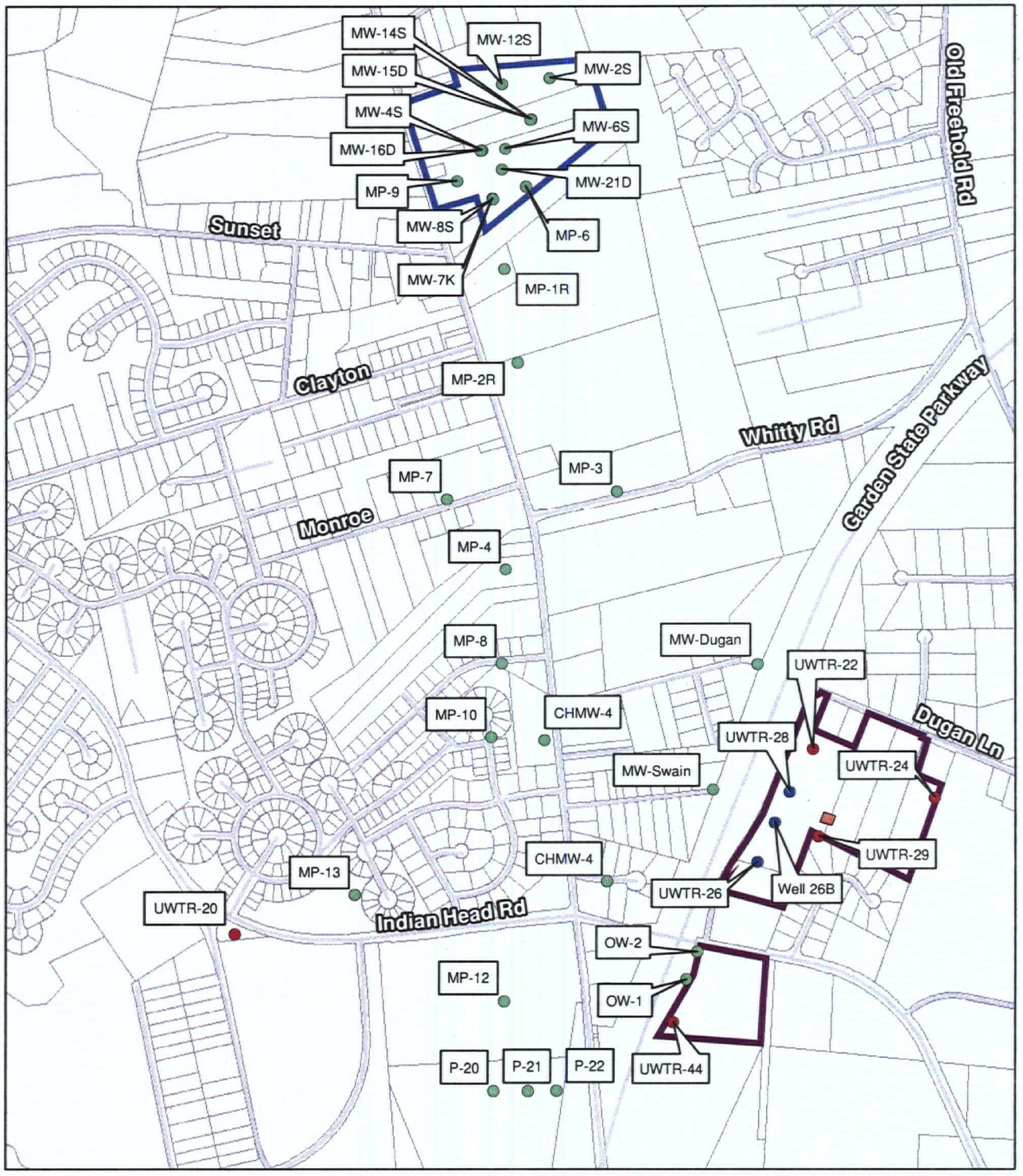
Chemical of Concern	1988 State MCL (ppb)	1988 Federal MCL (ppb)	2008 State MCL (ppb)	2008 Federal MCL (ppb)	2008 NJ GWQS (ppb)
					NJAC7:9-6
Methylene chloride	2	NG	3 (NJ MCL (A-280)	NG	3
Toluene	Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	2,000	1000	1000	600
Acetone	NG	NG	NG	NG	6,000
Trichloroethene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280)	5	1
2-Butanone	NG	NG	NG	NG	NG
Carbon Tetrachloride	2, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	2 (NJ MCL (A-280)	5	1.0
Tetrachloroethene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280)	5	1.0
1,1,1-Trichloroethane	26	200	30 (NJ MCL (A-280)	200	30
4-Methyl-2-Pentanone	NG	NG	NG	NG	NG
Chloroform	5, Total Concentration	NG	NG	NG	70

	limit for all contaminants with this indicator is 50 ppb in groundwater				
Benzene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280)	5	1.0
Bis-2-(ethylhexyl) phthalate	NG	21,000 (Clean Water Act Water Quality Criteria for Human Health Adjusted for Drinking Water	6 (as di (2-ethylhexyl)phthalate	6 (as di (2-ethylhexyl)phthalate	30
Pentachlorophenol	NG	220, (MCLG not MCL)	1	1	0.3
2,4-Dichlorophenol	NG	NG	NG	NG	20
4-chloro-3-methylphenol	NG	NG	NG	NG	NG
Di-n-butyl phthalate	NG	NG	NG	NG	700
Benzo(k)fluoroanthene	NG	NG	NG	NG	0.5
Pyrene	NG	NG	NG	NG	200
Isophorone	NG	NG	NG	NG	40
N-nitrosodi-n-proplylamine	NG	NG	NG	NG	10
Fluoroanthene	NG	NG	NG	NG	300
Aluminum	NG	NG	NG	50 to 200 based on secondary standard	200

Barium	1,000	4,700	2,000	2,000	6,000
Beryllium	NG	NG	4	4	1
Cadmium	3.7	5.0	5	5	4
Calcium	NG	NG	NG	NG	NG
Chromium	50 (NJ Pollution Discharge Elimination System (NJPDES)-Groundwater Protection	100 (Proposed Safe Drinking Water Act MCL)	100	(total) 100	70 (total)
Cobalt	NG	NG	NG	NG	NG
Copper	NG	1,300 (Proposed Safe Drinking Water Act MCL)	1,300 (Action Level - trigger point at which remedial action is to take place)	Treatment Technique Action Level = 1,300 T	1,300
Iron	NG	300 (Safe Drinking Water Act Secondary Standards)	NG	300 (Safe Drinking Water Act Secondary Standards)	300
Lead	50	50 (Safe Drinking Water Act Primary Standards)	15 (Action Level - trigger point at which remedial action is to take place)	15 Treatment Technique	5
Magnesium	NG	NG	NG	NG	NG
Manganese	NG	50 (Safe Drinking Water Act Secondary Standards)	NG	50 (Secondary Standard)	50
Mercury	2 (NJAC 7:9-6 Groundwater Standards, NJ Water Pollution	2 (Safe Drinking Water Act Primary	2	2	2 (total)

	Control Act)	Standards)			
Nickel	13.4	NG	>No MCL - (monitoring required).	NG	100 (based on soluble salts)
Potassium	NG	NG	NG	NG	NG
Selenium	10 (NJAC 7:9-6 Groundwater Standards, NJ Water Pollution Control Act)	10 (Safe Drinking Water Act Primary Standards)	50	50	40 (total)
Silver	50	50 (Safe Drinking Water Act Primary Standards)	NG	100 (Secondary Standard)	40
Sodium	NG	NG	NG	NG	50,000
Tin	NG	NG	NG	NG	NG
Vanadium	NG	NG	NG	NG	NG
Zinc	NG	5,000 (Safe Drinking Water Act Secondary Standards)	NG	5,000 (Safe Drinking Water Act Secondary Standards)	2,000

Reich Farm Groundwater Monitoring Well Network



Legend

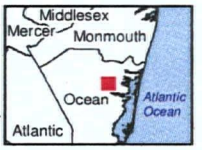
- Public Supply Wells
- Groundwater Recovery Wells
- Groundwater Monitoring Wells
- Parkway Well Field
- Reich Farm Superfund Site

0 500 1,000 Feet

1 inch = 1,000 feet

Reference:
Toms River Twp. Tax Blocks and Lots

NAD 1983 State Plane NJ
Projection: Transverse Mercator
Linear Unit: Feet



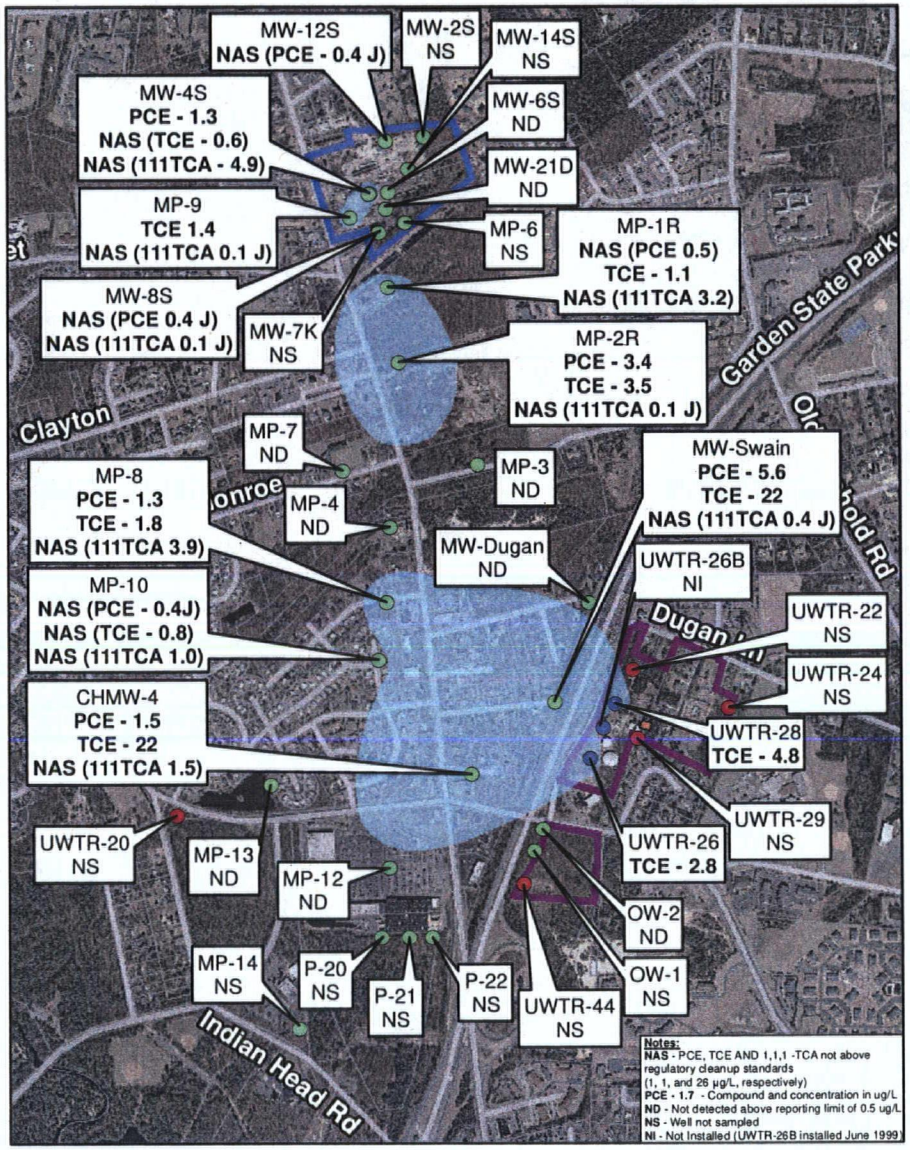
URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job:	41569476
Prepared by:	VP
Checked by:	MC
Date:	3/13/2013

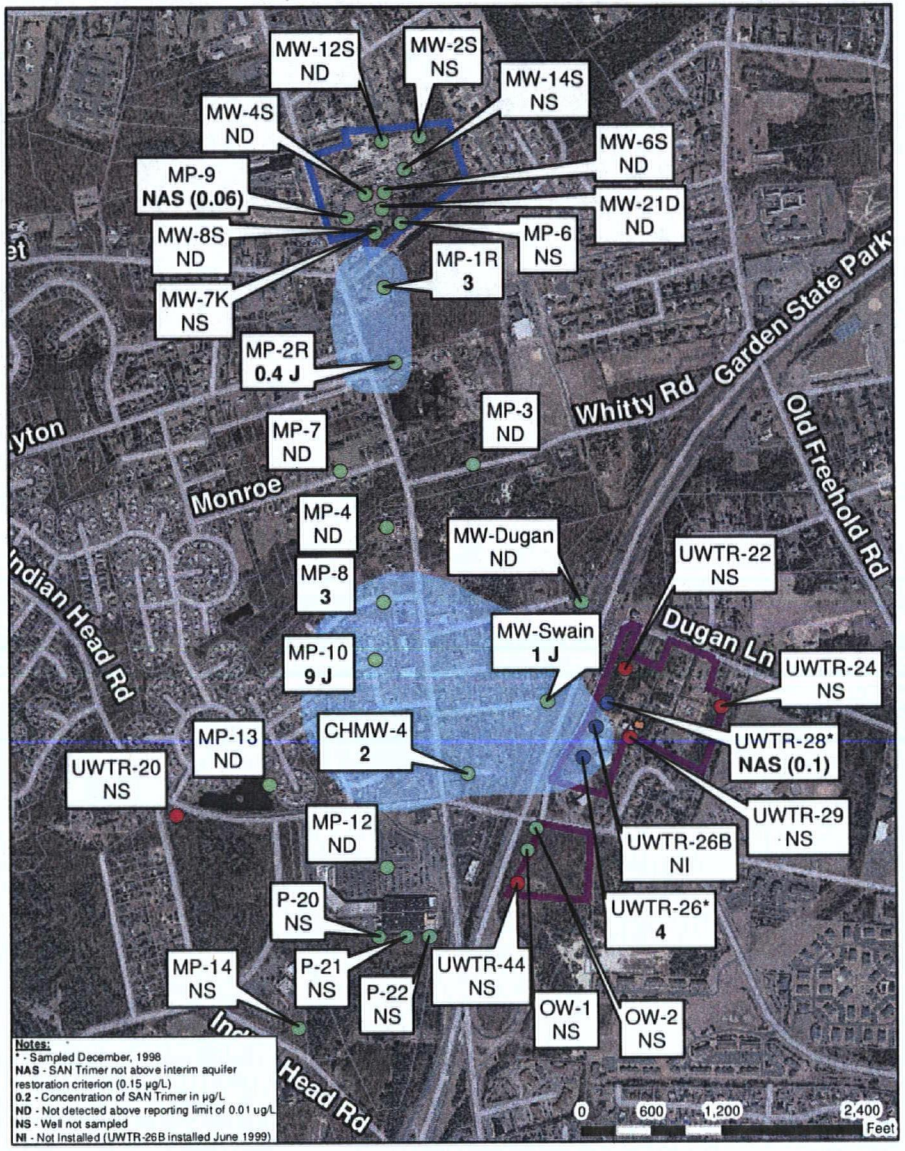
FIGURE 1
GROUNDWATER MONITORING WELL NETWORK
Reich Farm Superfund Site
Toms River Township, New Jersey

Path: S:\Projects\IMS\DOW\REICHFARM\Projects\5YearReview\Figure 1 Monitoring Well Network.mxd

2a. Jan 1999 VOC Concentrations



2b. Jan 1999 San Trimer Concentrations



URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job: 41569476

Prepared by: VP

Checked by: MC

Date: 3/13/2013

Legend

- Public Supply Wells
- Groundwater Recovery Wells
- Groundwater Monitoring Wells
- Parkway Well Field
- Reich Farm Superfund Site
- VOCs or San Trimer At or Above Regulatory Cleanup Standard
- Granular Activated Carbon Treatment System

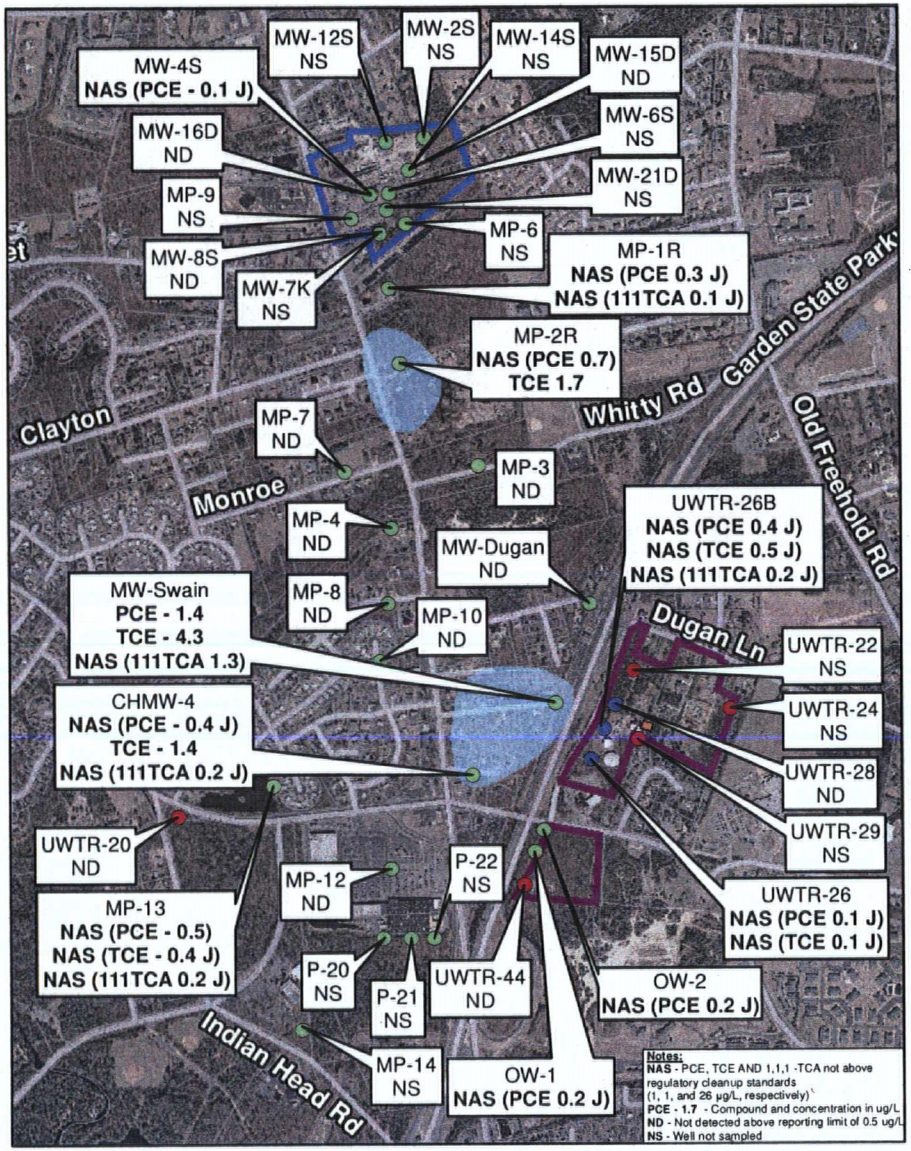
Key Map Not to Scale

FIGURE 2
1999 VOC and San Trimer Groundwater Concentrations
Reich Farm Superfund Site

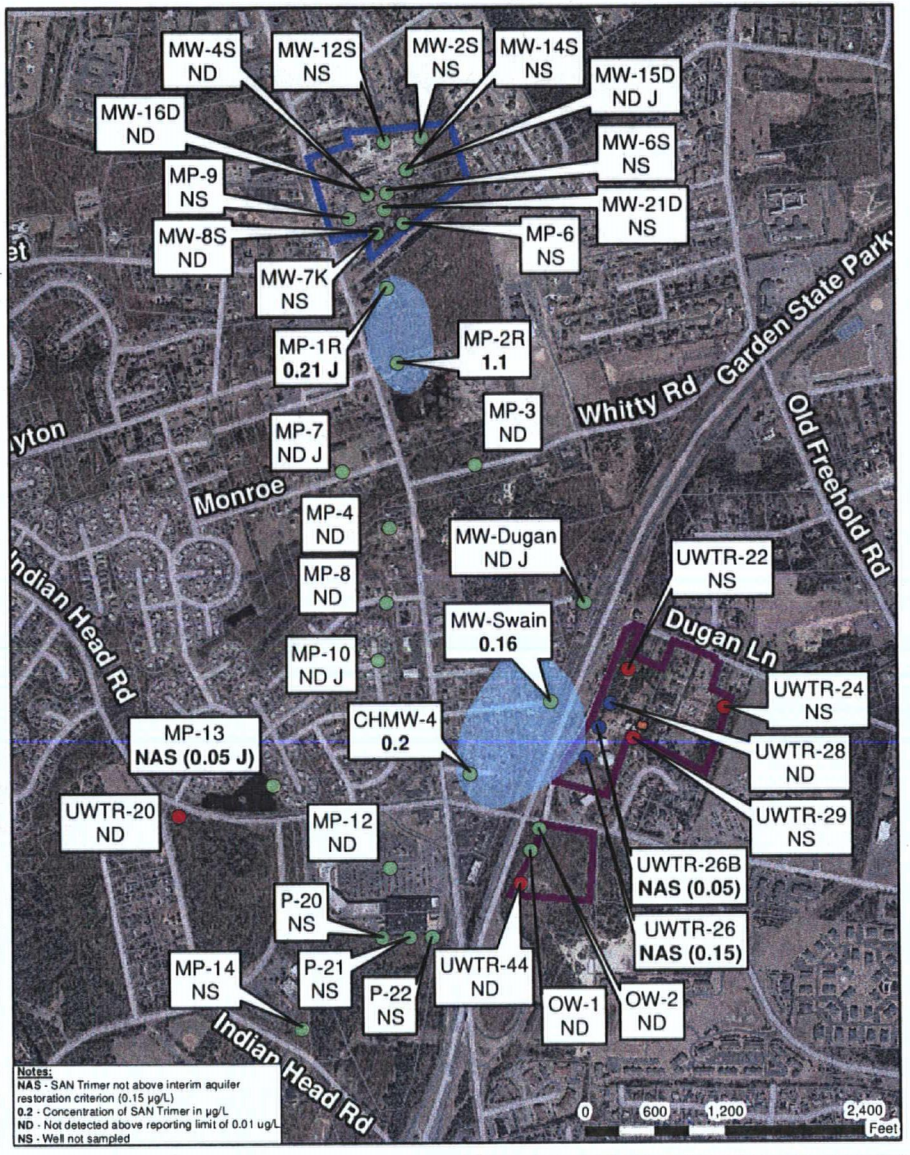
Toms River Township, New Jersey

S:\Projects\IMS\DOW\REICHFARM\Projects\5YearReview\Figure 2 1999 VOC and San Trimer Concentrations.mxd

3a. Dec 2007 VOC Concentrations



3b. Dec 2007 San Trimer Concentrations



URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job: 41569476

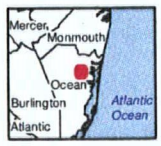
Prepared by: VP

Checked by: MC

Date: 3/13/2013

Legend

- Public Supply Wells
- Groundwater Recovery Wells
- Groundwater Monitoring Wells
- Parkway Well Field
- Reich Farm Superfund Site
- VOCs or San Trimer At or Above Regulatory Cleanup Standard
- Granular Activated Carbon Treatment System



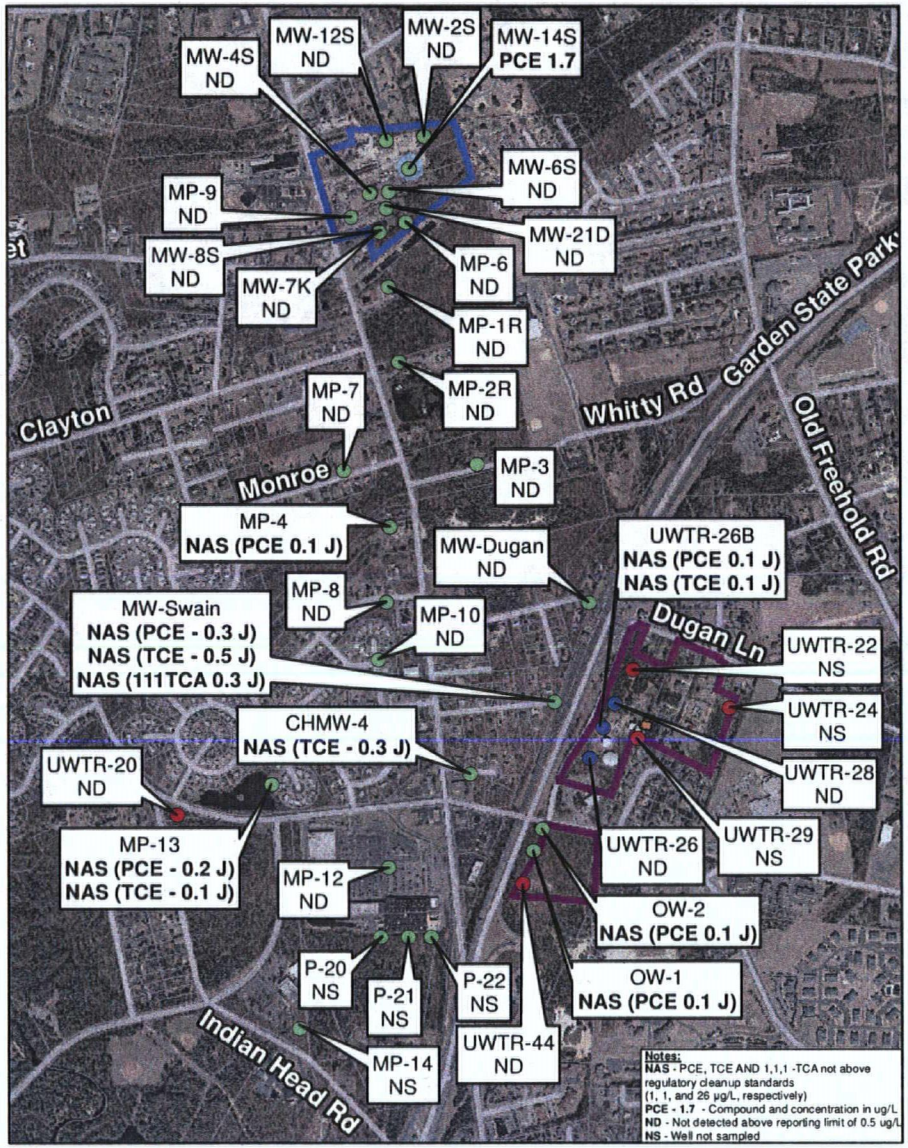
Key Map Not to Scale

FIGURE 3
2007 VOC and San Trimer Groundwater Concentrations
Reich Farm Superfund Site

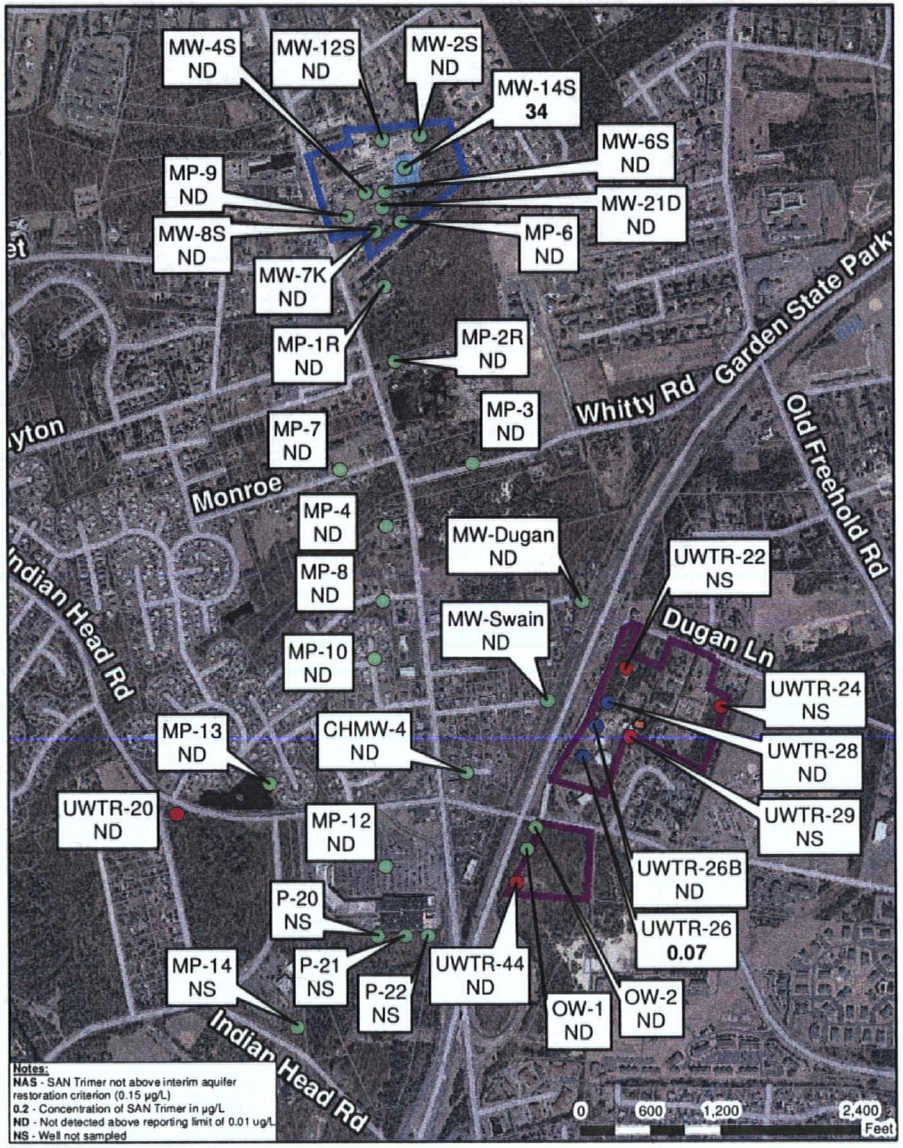
Toms River Township, New Jersey

S:\Projects\MS\DOW\REICHFARM\Projects\5YearReview\Figure 3 2007 VOC and San Trimer Concentrations.mxd

4a. Dec 2010 VOC Concentrations



4b. Dec 2010 San Trimer Concentrations



URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job: 41569746

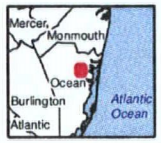
Prepared by: VP

Checked by: MC

Date: 3/13/2013

Legend

- Public Supply Wells
- Groundwater Recovery Wells
- Groundwater Monitoring Wells
- Parkway Well Field
- Reich Farm Superfund Site
- VOCs or San Trimer At or Above Regulatory Cleanup Standard
- Granular Activated Carbon Treatment System



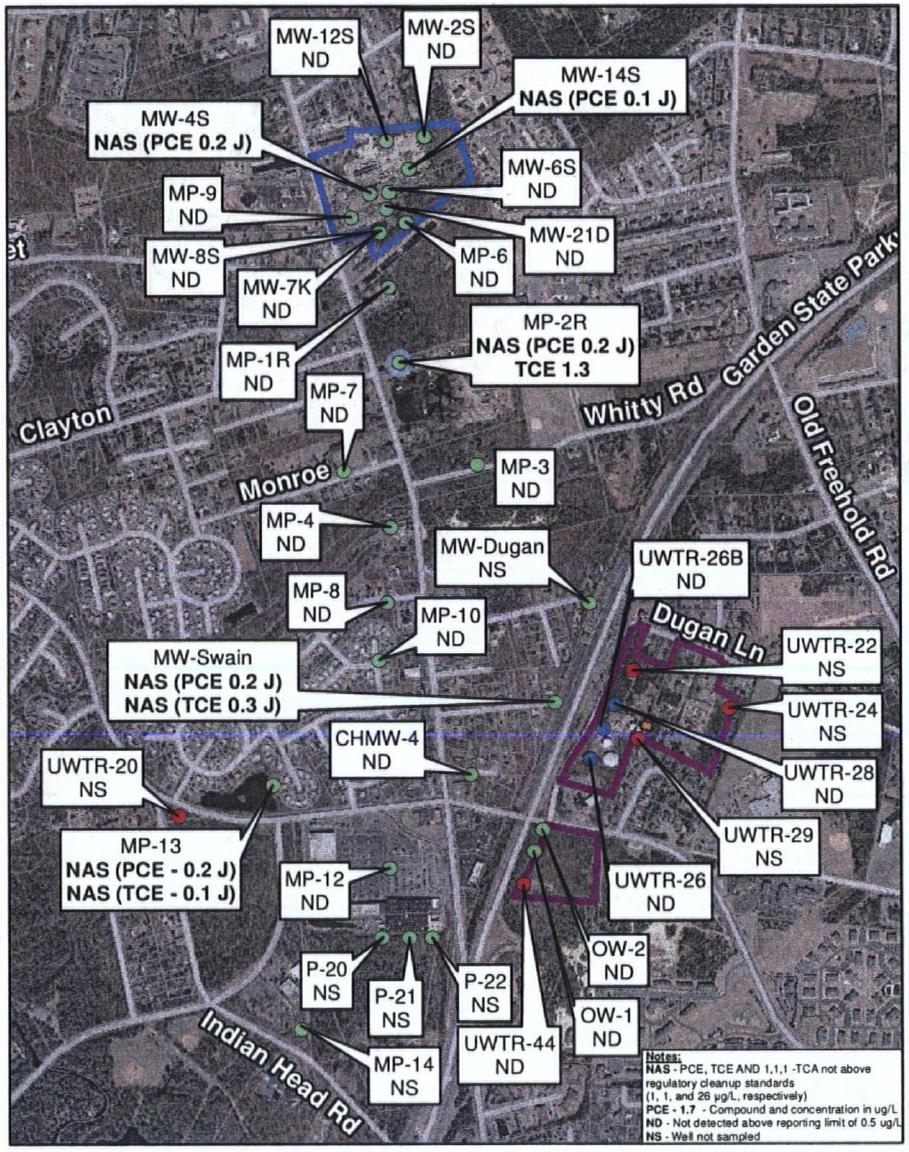
Key Map Not to Scale

FIGURE 4
2010 VOC and San Trimer Groundwater Concentrations
Reich Farm Superfund Site

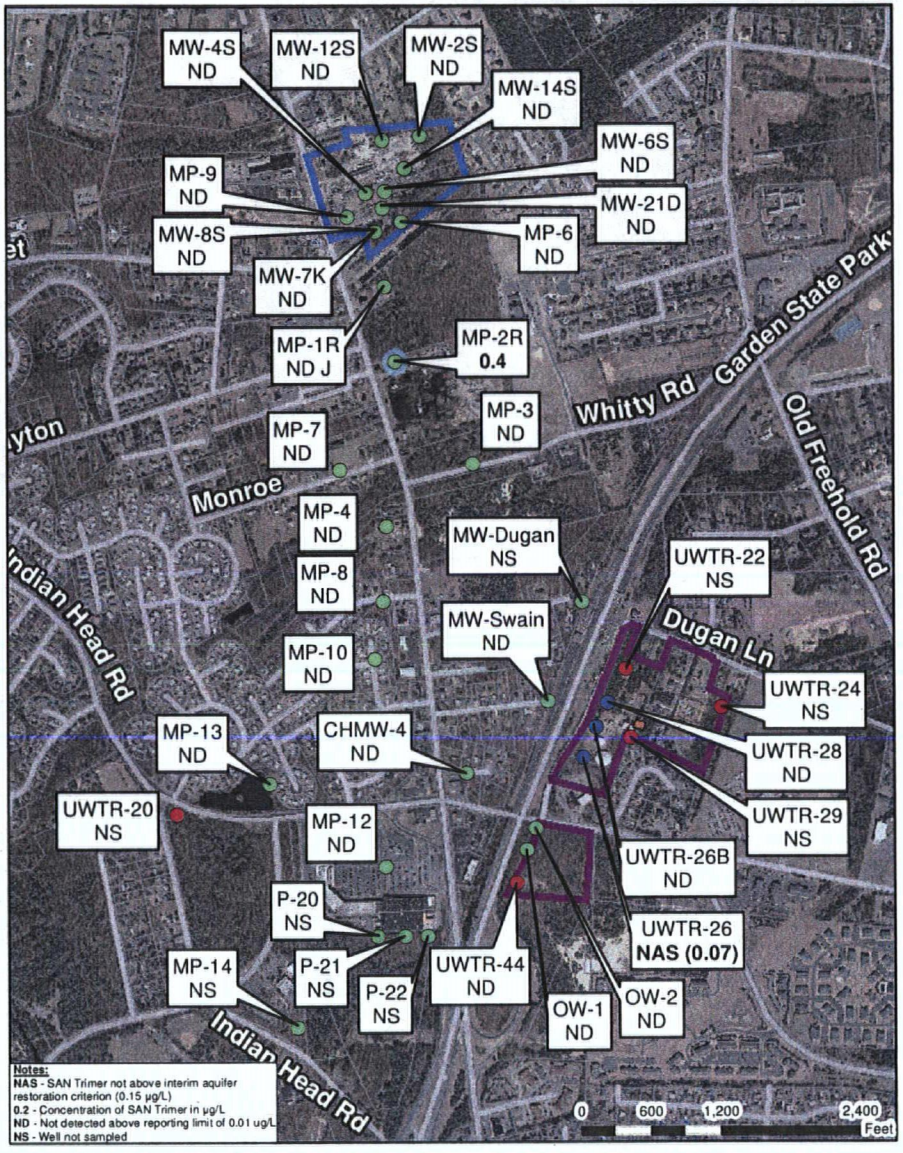
Toms River Township, New Jersey

S:\Projects\IMS\DOW\REICHFARM\Projects\5YearReview\Figure 4 2010 VOC and San Trimer Concentrations.mxd

5a. Dec 2012 VOC Concentrations



5b. Dec 2012 San Trimer Concentrations



URS
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
Phone: (215) 367-2500 Fax: (215) 367-1000

Job: 41569476

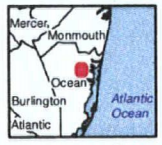
Prepared by: VP

Checked by: MC

Date: 3/13/2013

Legend

- Public Supply Wells
- Groundwater Recovery Wells
- Groundwater Monitoring Wells
- Parkway Well Field
- Reich Farm Superfund Site
- VOCs or San Trimer At or Above Regulatory Cleanup Standard
- Granular Activated Carbon Treatment System



Key Map Not to Scale

FIGURE 5
2012 VOC and San Trimer Groundwater Concentrations
Reich Farm Superfund Site

Toms River Township, New Jersey

S:\Projects\IMS\DOW\REICHFARM\Projects\5YearReview\Figure 5 2012 VOC and San Trimer Concentrations.mxd